

**THE UNIVERSITY OF CHICAGO**

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## Background Art

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More specifically, the invention according to a first aspect relates to a filing appliance comprising means for holding a plurality of sheets of, for instance, paper. The filing appliance is characterized by at least one input field which is provided with a position-coding pattern and is adapted to be filled in by means of a drawing device which digitally records, using said position-coding pattern, positions in the input field in order to digitally record information entered in the input field, and an initiation icon provided with a position-coding pattern, a marking of the initiation icon by means of the drawing device being adapted to initiate an operation in a computer system communicating with the drawing device, in which operation an information object is created, which is identifiable at least by means of information entered in the input field. This allows creating a "digital copy" of a filing appliance. Information that is subsequently entered into the filing appliance may also be copied and entered into this "digital filing appliance". The information is easily organized and may be shared, for instance via email.

Preferably, the input field is adapted to be filled in at least with handwritten text which can optionally be OCR interpreted. This allows easy identification and search of a created information object.

In a preferred embodiment, an input field is also adapted to be filled in at least with an illustration.



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of said drawing device as graphical inputs, and a send icon provided with a position-coding pattern, a marking of the send icon initiating an operation in the computer system, in which operation graphical inputs entered on the sheet of paper and recorded digitally are transferred to the computer system and optionally on to an external computer system.

With such a filing appliance, transfer of information can be initiated without the user directly needing to initiate an operation in the computer system by means of e.g. a computer mouse or keyboard.

In a preferred embodiment, the information object comprises a table in a database. This simplifies arranging and editing of information entered in a system.

In an alternative embodiment, the information object comprises a file, which results in a comparatively simple recording procedure.

A filing appliance preferably comprises an archiving icon, a marking of the archiving icon being adapted to initiate an operation wherein position information corresponding to strokes of the drawing device, which strokes are generated after a reference time point, is transmitted from the drawing device to the computer system. This allows the user to utilize the drawing device and the filing appliance offline and subsequently transferring registered information.

25 In yet another preferred embodiment, the filing app-  
pliance comprises an archiving icon provided with a posi-  
tion-coding pattern, which is arranged in such manner

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information object vis-à-vis the application in the computer system, the second information object being related to a second filing appliance; and that position information generated before said time point  $t_{act}$  is inserted in the first information object whereas position information generated after said time point  $t_{act}$  is inserted in the second information object. This allows the activation of a new filing appliance vis-à-vis the computer system to be performed offline. The computer system still arranges incoming information correctly.

#### Brief Description of the Figures

- Figs 1a and 1b illustrate various conceivable embodiments of a filing appliance.
- Fig. 2 illustrates an open filing appliance according to the invention.
- Fig. 3 illustrates an open filing appliance according to an embodiment of the invention with an unfolded palette flap as well as a drawing device and a computer system in connection with which the inventive filing appliance is intended to be used.
- Fig. 4 shows a filing appliance according to an embodiment of the invention with an open order page.
- Fig. 5 shows a sheet of paper for a filing appliance according to an embodiment of the invention.
- Fig. 6 shows, in a more distinct form, distinctive features of a filing appliance according to the present invention, which are indicated in Fig. 2.



Fig. 7 shows, in a more distinct form, distinctive features indicated on a sheet of paper as shown in Fig. 5.

Fig. 8 shows, in a more distinct form, distinctive features indicated on the palette flap shown in Fig. 3.

Fig. 9 shows, in a more distinct form, distinctive features indicated on the order page shown in Fig. 4.

Fig. 10 shows an example of the appearance of a position-coding pattern.

Fig. 11 shows another example of the appearance of a position-coding pattern.

Fig. 12 illustrates a method in a computer system according to an aspect of the invention.

#### Description of Preferred Embodiments

Fig. 1a and Fig. 1b illustrate various conceivable embodiments of a filing appliance.

In Fig. 1a, the filing appliance is in the form of a ring binder. Its cover parts 1 (of which the upper is visible and the lower is concealed), i.e. the parts encompassing the sheets of paper, are then preferably relatively stiff. A comparatively large number of sheets are with the aid of attachment means 2 of bifurcated form (also to be found in Fig. 2) releasably attached in the filing appliance.

In Fig. 1b the filing appliance is in the form of a spiral binder. The cover parts 3 are then usually softer than those of the ring binder and a usually somewhat smaller number of sheets of paper are then attached with

the aid of attachment means 4 of coiled form. Also other types of attachment means than those mentioned above can be used, such as clamps.

Fig. 2 shows an open filing appliance according to  
5 the invention.

A first 6 and a second 7 input field as well as an initiation icon 8 are printed on the inside 5 of the top cover part. The first input field, the second input field and the initiation icon are shown more clearly in Fig. 6.

10        A user who intends to use the filing appliance fills  
in either text in the first input field 6 or an  
illustration in the second input field 7, or both. The  
first 6 and the second 7 input field are provided with a  
position-coding pattern (not shown). The position-coding  
15 pattern can be relatively coded, but is preferably  
absolutely coded, which will be discussed in more detail  
below. Also a combination of absolute and relative  
position-coding patterns can be used.

A user can fill in text or digits that he or she  
20 wants to characterize the filing appliance in the first  
input field. The text or digits are filled in by means  
of a drawing device of a type that simultaneously, while  
using the position-coding pattern, detects positions on  
the base on which the input field is printed. In this  
25 way, the information entered in the first input field 6  
is recorded by the drawing device, as a sequence of posi-  
tions.

Preferably before, but possibly also after, doing this, the user marks the initiation icon 8. When the user has marked the initiation icon 8 he enters information in one of the first 6 or the second 7 input fields,. The marking can result in the initiation icon 8 being struck through, crossed out or merely touched by the drawing device. The initiation icon 8 may contain a position-code that exclusively indicates the initiation of a new filing appliance.

20 Preferably, at least a subset of the sheets of paper  
which are attached in the filing appliance is also pro-  
vided with position-coding patterns, so that notes being  
made on the sheets of paper using the drawing device are  
recorded by the same and can be entered in a suitable  
25 fashion in the information object created. In the case  
where the information object is a table, one of the  
sheets of paper can correspond to an item in the table.

The notes can then easily be printed using a printer connected to the computer system. They can also easily be sent to other interested people, for example as e-mail.

According to the present application, a position-coding pattern is generally used, which will later on be described in more detail. The position-coding pattern affords, as mentioned above, the possibility of recording text, digits and illustrations which are written on a sheet of paper, using a drawing device, which is capable of detecting positions on the sheet of paper by means of the position-coding pattern. This text or these digits can be recorded in vector format, but it is also possible to carry out character recognition operations as regards the entered information. An "A" entered on a sheet of paper using a drawing device as described above can thus be recorded either as a set of recorded coordinates, or as the character "A", with a certain ACSII code, for instance subsequent to OCR (Optical Character Recognition) interpretation.

As indicated above, the position-coding pattern can also be used to record Boolean variables. If positions in an initiation icon are recorded by the system, this means that a state in a computer system communicating with the drawing device changes state. When a user ticks a box provided with a position-coding number, this is thus recorded by the system so that a certain parameter is set to be a logic "one".

The first 6 and the second 7 input field, as well as the initiation icon 8, can, of course, be located in other parts of the filing appliance, for instance on the bottom cover 9 or one of the attached sheets of paper 10.

5 Fig. 3 shows an open filing appliance according to an embodiment of the invention with an unfolded palette flap 11 as well as a drawing device 12 and a computer system 13 (in the case shown, a PC), in connection with which the filing appliance according to the invention is  
10 intended to be used. The filing appliance, the drawing device and the computer system jointly form a system for information management. The computer system may also consist of a storage on the Internet.

The palette flap 11 is provided with appearance  
15 icons, which are shown more clearly in Fig. 8 and described in more detail in connection with the description of this Figure. Such appearance icons can also be printed on other parts of the filing appliance or on separate slips of paper or rulers.

20 The drawing device 12 is handheld and preferably of a type which makes an ink trace when writing on a base while at the same time positions on the base are recorded if this is provided with a position-coding pattern, which the drawing device 12 can interpret. The drawing device  
25 12 can communicate with a computer system 13 by means of a cable, a short-range radio link or an IR (infrared)

link. The computer system, or the computer unit 13, can also be integrated in the drawing device.

Fig. 4 shows a filing appliance according to an embodiment of the invention with an open order page. The

order page can be used to order a further filing appliance, for instance when the user's filing appliance is filled with writing. The distinctive features of the order page will be described in more detail in connection with Fig. 9.

Fig. 5 shows a sheet of paper for a filing appliance according to an embodiment of the invention.

At least one side of the sheet of paper is provided with a position-coding pattern so that notes, which are written on the sheet by means of a drawing device of

the above type, can be recorded digitally by the drawing device and then be transmitted to the computer system.

The sheet of paper also comprises functionality which is used to initiate transmission of information entered on the page from the drawing device to the computer system

and optionally on to an external computer system, which will be described in more detail in connection with

Fig. 7.

Fig. 6 shows, in a more distinct form, distinctive features of a filing appliance according to the present

invention, which are indicated in Fig. 2.

The first input field 6 is adapted to be filled in with text and/or digits, for example as shown

5 e.g. a checkered pattern can be used.

10 17.

15 optionally in the computer system linked to an icon  
representing a test tube.

20 20, a fax box 21 and a send box 22 are shown on the sheet  
of paper. Preferably, the entire side of the sheet can be  
provided with a position-coding pattern. A user may then  
with a drawing device of the above type write down notes  
on the sheet of paper, the notes being recorded digital-  
25 ly by the device and being transmittable to the computer  
system. The digitally recorded information may preferably  
be inserted in the relevant information object in the

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Pages in the binder, or the binder itself, may also be provided with an archiving icon 22b, the use of which will be described below.

When coordinates in the send area are detected, the processor 12c reacts and initiates connection to the computer system 13, for example via the communication unit 12f and a Bluetooth™ modem 13a, which is connected to the computer system 13. An application in the computer system 13 is opened. Which application is opened is determined by the coordinates in the send region.

The application records the coordinate area of the page, which is included in the above dash, and initiates a communication where the coordinates which are allocated to the coordinate area of the entire page are demanded.

15 The coordinates that are stored in the buffer memory 12d of the drawing device and which belong to the coordinate area of the page are transferred to the application in the computer system. It should be noted that the application can determine that only one page from the binder is

20 to be transferred, or a plurality of pages.

The application then determines how the transferred information is to be processed. Conveniently the information is stored in a file which is marked with the above-mentioned keyword or symbol or an identification in the title line 19, and optionally the date of the transfer.

The application can also be adapted to determine whether the boxes 20 or 21 are marked. If this is the

Next time the computer system is connected to the telephone network via a fax modem or to the Internet, or immediately, the fax or the e-mail message will be sent. The application can also provide an indication that the transmission is accomplished. In e-mail, a copy is suitably sent to the sender's e-mail letter box, confirming that the e-mail message has been sent.

Alternatively, the drawing device may comprise a larger memory and keep all information in the filing appliance in question in the memory. When the next filing  
15 appliance is initiated, the memory is emptied to the computer system 13 and stored there permanently, whereupon the use of a new filing appliance is begun. The emptying of the memory can also take place to a server on the Internet etc.

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5 triggers the processor 12c of the drawing device 12.

an area 23 together with its associated symbol 23' can be said to be an appearance icon. By marking with the drawing device of the above type such an appearance icon, a subsequent, or preceding, digitally recorded graphical input on a sheet of paper in the filing appliance is given a certain visual property. This can be described as qualification of the graphical input. If, for example, the area 25 associated with the symbol 25' which represents the greatest stroke weight is marked, a subsequent graphical input on a sheet of paper can be given a corresponding stroke weight. This stroke weight does not appear on the sheet of paper but only in the digital recording of what is being written on the sheet. If the digitally recorded information is shown, for instance, in a user interface with the display of the computer system, the graphical input with the selected stroke weight thus appears. In some computer systems, the given visual property need not be shown. Fig. 3 shows three appearance

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A position code that is detected by means of the drawing device is preferably given a time stamp. Hence, each stroke by the drawing device is given a starting time point and an ending time point. A filing appliance preferably comprises an archiving icon, which is provided with a position-coding pattern. The pattern includes such positions that a marking of the archiving icon by means of the drawing device initiates an operation, wherein position information corresponding to strokes of the drawing device, which strokes are generated after a reference time point  $t_{ref}$ , is transmitted from the drawing device to the computer system. The reference time point is the time when a computer system was last updated with strokes from the drawing device.

In connection with the transmission of the position information the reference time point is set to the current time.

In an easily implemented embodiment the reference time point is stored in the drawing device. In an alternative embodiment the reference time point may be stored in the computer system. This allows the drawing device to operate vis-à-vis more than one computer system, each having an individual reference time point. When the archiving operation is initiated the computer system requests strokes generated after  $t_{ref}$  whereupon  $t_{ref}$  is set to the current time.

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the second filing appliance. According to the inventive method, position information generated before  $t_{act}$  (in pages 40, 41) is inserted into the first information object 45, for instance a first file, whereas position information generated after  $t_{act}$  (in pages 42, 43, 44) is inserted in the second information object 46, for instance a second file.

Fig. 10 shows an example of the appearance of a position-coding pattern. The position-coding pattern is absolutely coded, i.e. designed so that if a subset, with a certain minimum size, of the pattern is recorded the position of this subset in the total pattern can be determined unambiguously.

The position-coding patterns shown in Applicant's previous Patent Applications WO 00/73983 and WO 01/26032 are capable of defining a very large area (for example counted in the number of A4 pages) with high resolution. There each position is coded with a plurality of symbols and each symbol codes a plurality of positions. The position-coding pattern shown in Fig. 10 is made up as shown in WO 00/73983 where a large dot represents a "one" and a small dot represents a "zero". However, it is also possible to design the position-coding pattern as shown in WO 01/26032, see Fig. 11, where different displacements of a dot in relation to a virtual raster pattern (indicated by dashed lines) codes different symbol values.

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